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Phenomena of Elementary School Teacher's Views on Mathematics Learning Outcomes from the Psychological Spread

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Abstract
This paper aims to describe the views of elementary school teachers on the results of learning mathematics from the psychomotor domain in Bantul district, Yogyakarta, Indonesia. This study uses a qualitative descriptive method with a phenomenological approach. Data collection techniques were carried out by interviews and observation. Research subjects were determined by purposive sampling technique. The validity of the human instrument was measured by the researchers themselves, while the validity of the documents was measured by matching techniques. Data were analyzed through stages: reducing data, presenting data, and drawing conclusions. The results of the study stated that the views: 29 out of 40 teachers (72.5%) stated that psychomotor indicators could not be described because psychomotor relates to physical while mathematics relates to cognitive; 7 out of 40 teachers (17.5%) stated that psychomotor indicators were seen from the willingness of students to copy math work; and 4 out of 40 teachers (10%) stated that students were able to imitate the stages of solving math problems. The conclusion of this study is that teachers have not been able to describe psychomotor indicators in a concrete way because they assume that mathematics has a relationship with cognitive development.

Keywords: Teacher's View, Mathematics Learning, Psychomotor Domain

Introduction

The definition of view in the Big Indonesian Dictionary (KBBI) is explained as an individual's way of thinking about a particular problem or object that he considers to have truth. Paying attention to the meaning of the word view, views cannot be separated from life (in this case individual elementary school teachers) in paying attention to the learning being carried out. Nasution (2015) [13] states that outlook on life is a consideration that is used as a guide, guideline, direction for life in society so that they are able to lead a better life. Meanwhile, Sulisadi and Sofwani (2011) [21] stated that outlook on life is the result of thoughts and experiences in the form of useful life values, so that they are used as guidelines, guidelines, and give direction in living life.

The above understanding emphasizes that a view of life will give way to life because it has a truth value. Likewise with the teacher's view of the results of learning mathematics. In the current phenomenon, teachers should have the view that mathematics learning outcomes need to be analyzed for indicators from each of the development domains. The analysis should be balanced for each domain, namely cognitive, affective and psychomotor. This balance is caused by the values of truth that exist in learning that elementary school students need to be able to deal with their socio-cultural life. The values of life in each subject are ensured. This is confirmed by Nasution (2015) [13] who states that views of life based on their domain origin are classified into three domains, namely:

1. A view of life that comes from religion, namely having absolute truth (Hakiki).
2. A view of life in the form of an ideology, that is, the truth value Adjusts with the culture and norms prevailing in that country.
3. The view of life from the results of contemplation, has a truth value that is relatively.

The current phenomenon is that elementary school teachers are of the view that learning mathematics is synonymous with the process of developing logical thinking or furthermore it is also associated with the development of the affective domain, namely: honesty and fairness. Students are said to develop logical thinking if it is indicated from the results of the learning evaluation that they have a value above the minimum completeness criteria (KKM). The definition of KKM is the lowest (minimum) mark that needs to be obtained by students for the mathematics material being taught, but setting these limits takes

into account carrying capacity, complexity, and intake. The value of the definition of KKM above, based on observations and interviews, data shows that the evaluation stage carried out by the teacher begins with students participating in mathematics learning for certain competencies. After the material has been given, the teacher gives the first stage of evaluation. As a result of this evaluation, data were obtained that groups of students had scores equal to or below the KKM and groups of students with scores above the KKM. Students who get scores below or equal to the KKM, the teacher will provide remedial with the same problem material. Remedy is given until students get a score above the KKM.

The results of the researchers' observations of 40 elementary school (SD) teachers in the Srandakan and Piyungan sub-districts, Bantul-Yogyakarta district, Indonesia, obtained the following data:

1. 22 out of 40 teachers (55%) carry out mathematics learning in the following order:

a. The teacher reads the learning objectives of the material to be taught.
b. The teacher explains math material using print media, namely reference books.
c. The teacher gives examples of questions and gives steps to answer.
d. Students copy examples of questions along with the steps to answer them.
e. The teacher tries to explain the problems in the reference book and tries to answer by writing down the steps for solving them.
f. Students copy what the teacher explains.
g. The teacher gives time to students to try to answer the questions in the reference book.
h. The teacher gives students the opportunity to try to write answers on the blackboard.
i. The teacher gives homework to students
j. Homework is discussed at the next meeting (if the meeting time is sufficient).
k. The teacher provides an evaluation and classifies students based on the acquisition of grades.
l. The teacher gives a remedy

Learning mathematics with the stages above is directed to invite students to focus on what is being taught by the teacher. students sit neatly in their seats, pay attention to what the teacher says, copy what is written on the blackboard, do exercises similar to those exemplified by the teacher, memorize formulas. If students get less than optimal scores, the teacher will give less answers in memorizing and practicing questions. The indicators that appear are conical to operational verbs namely following, remembering and understanding. These indicators fall into the realm of affective and cognitive.

2. 10 out of 40 teachers (25%) carry out mathematics learning in the following order:

a. The teacher reads the learning objectives of the material to be taught.
b. The teacher explains the media that will be demonstrated
c. The teacher demonstrates learning media
d. The teacher asks students to demonstrate
e. The teacher gives an example of solving the questions prepared.
f. Students work on the exercises that have been prepared, both in groups or individually.
g. The teacher gives an evaluation and classifies students based on value acquisition.
h. The teacher implements remedial.

Mathematics learning with the stages above is directed to be oriented towards the process of building mathematical concepts or theories, not results. Demonstrations are used to make students active in learning mathematics. However, the media provided focuses on just one competency without involving prerequisite material. Students whose evaluation scores are not optimal, the teacher will give answers because students are passive in demonstrations, do not focus on learning, lack practice questions, and do not want to memorize formulas. The indicators that appear are conical to operational verbs namely following, remembering, and understanding. These indicators fall into the realm of affective and cognitive.

3. 6 out of 40 teachers (15%) carry out mathematics learning in the following order:

a. The teacher informs the math lesson plan outside the class on the day before the implementation of learning mathematics begins.
b. During the implementation of learning, the teacher explains the learning objectives of the material to be taught.
c. The teacher divides students into work groups.
d. In each working group, the teacher provides student worksheets (LKPD).
e. Students are asked to present the results of group work
f. The teacher evaluates and classifies students based on value acquisition.
g. The teacher implements remedial.

Mathematics learning with the stages above is intended for learning to occur among students. The teacher's reason is to build knowledge from the social culture of students. So that students who experience obstacles in mathematical concepts or theories are expected to be taught by their group mates. To describe students who are weak in learning mathematics, the teacher gives answers because they lack concentration, are afraid to ask questions, and lack practice questions. The indicators that appear are conical to operational verbs namely following, asking, answering, remembering, and understanding. These indicators fall into the realm of affective and cognitive.

4. 2 out of 40 teachers (5%) carry out mathematics learning in the following order:

a. Teachers prepare student worksheets (LKPD) themselves or those that already exist from publishers.
b. The teacher explains the learning objectives that will be carried out.
c. The teacher explains the mathematical formula not by constructing the formula, but by providing solutions to problems using mathematical formulas in the LKPD.
d. Provide opportunities for students to practice completing practice questions.
e. The teacher gives an evaluation and classifies students based on value acquisition.
f. The teacher does the remedial by asking to work on the problems in the LKPD.

Learning mathematics with the stages above is result-oriented. This is indicated by the emergence of fast counting techniques (practical formulas) in mathematics. The reason for using the learning stages above is to pursue curriculum targets and get optimal cognitive value. If there are students who have not completed it, it is advisable to take additional lessons at school or in tutoring. The teacher in describing the weaknesses of students in mathematics is by providing data

about low evaluation scores, not wanting to memorize formulas, and lack of practice working on questions. The indicators that appear are conical to operational verbs namely following, asking, answering, remembering, and understanding. These indicators fall into the realm of affective and cognitive.

Taking into account the mathematics learning model applied by the teacher above, it appears that the phenomenon of the teacher has not been able to provide indicator answers from the psychomotor domain. This needs to be described because giving reasons in the form of not taking it seriously, not memorizing formulas, and not practicing questions are the dominant reasons. As a consequence, the teacher's follow-up is to suggest to the parents of students to take part in additional learning or take part in tutoring.

Knowledge of education, all teachers know that in learning it is necessary to balance the development of the cognitive (knowledge), affective (attitude), and psychomotor (skills) domains. However, the mathematics learning targets written in the teaching modules still refer to cognitive development indicators and extend to attitude development. Lola Wiladatika, Stepanus Sahala Sitompul, Diah Mahmuda (in Sofyan, 2017) stated that psychomotor learning outcomes are a continuation of learning outcomes for the development of cognitive and affective domains, which can be observed after students show the same behavior with meaning in both domains in the student's life environment. The purpose of learning mathematics, for example, is written: students can operate multiplication on fractions, and students can work together in their groups to compile statistical data. The second is the target of learning mathematics, the teacher will provide answers from the development of the cognitive domain, namely indicators of the words being able to operate and compile. Meanwhile, the development of the affective domain is indicated by the word cooperate. Data from the teaching module document shows that teachers are still unable to describe indicators from the realm of psychomotor development.

Endang Wahyu Widayati (in Asep, 2014) [2] states that the psychomotor domain includes: imitating, manipulation, precision, articulation, and naturalization. The phenomenon of understanding above, 40 elementary school teachers do not understand thoroughly about the indicators of the psychomotor domain of mathematics learning outcomes. This is because the teacher has the view that mathematics is to develop the ability to think logically (more specifically only in the cognitive direction). This understanding is not completely wrong. Regulation of the Minister of Education and Culture (2016) states that Mathematics subjects need to be given to every student starting from elementary school in order to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to work together. It is this phenomenon that needs to be uncovered and described so that later elementary school teachers in learning mathematics are able to explain development indicators from the psychomotor domain.

Materials and Methods

This study uses a qualitative method with a phenomenological approach. Sugiyono (2018) [20] states that research can be called qualitative if the researcher becomes the key instrument and the object studied under natural conditions. Marambang Daulay (2010) [9] states that the phenomenological approach is a study that focuses on the experiences experienced by a person or individual in learning his life subjectively and giving meaning to his life. So, this qualitative research is aimed at describing the phenomenon of elementary school (SD) teachers' views on indicators of mathematics learning outcomes from the psychomotor domain. The research was carried out from October 2022 to March 2023.

The research implementation was located in the sub-districts, namely: Piyungan and Srandakan, Bantul district, Yogyakarta, Indonesia. The subjects in this study were: 40 teacher representatives from 15 public elementary schools and 5 private elementary schools which are inclusive schools and have been designated as friendly schools for students. In the 2022/2023 school year the 20 SDs, in implementing the independent curriculum, chose and determined it as an independent learning school. Considering that the independent curriculum is based on humanism, constructivism, and progressism, teachers must understand that each subject, including mathematics, is intended to be able to simultaneously develop cognitive (knowledge), affective (attitude), and psychomotor (skills) domains.

Djaman Satori and Aan Komariah (2013) [4] state that data collection activities are a systematic step in obtaining research data. In this study, the data collection was through: observation, in-depth interviews, and documentation. Kriyantono (2020) [7] states that interviews are active two-way communication between researchers as information seekers and informants as providers of information on certain objects. Interviews taken during the study, researchers set free interviews. The free interview approach was chosen because of the researcher's desire that the informant be able to provide information as profusely or as freely as possible according to the interpretation experienced and known so that a meaningful conclusion can be drawn. Sutrisno Hadi (2016) [23] states that observation is a complex stage or process, both biological and psychological processes, whose focus is on the results of observations and memories. Observations were carried out eight times when the subject carried out teacher activity groups (KKG) in two locations, namely at SD Negeri Karang Asem, Piyungan sub-district and SD Muhammadiyah Bendo, Srandakan sub-district. Observation results are collected in the form of diary notes. Arikunto (2016) [1] states the notion of documentation as a data collection activity on matters in the form of notes, transcripts, books, newspapers, minutes, report cards, agendas and so on. In this study, the documentation in question is a teaching module.

The data that has been entered will then be validated. Rukminingsih, Gunawan Adnan, Muhammad Adnan (2020) [16] stated the notion of validation as the level of honesty and truth from the results of research reports that describe, interpret, provide explanations, and make conclusions that can be accounted for. Validation in this study uses triangulation of data sources. Moleong (2023) [10] states the notion of data source triangulation is the activity of using various data sources, such as interview results, observation results, field notes (archives), and documents, or interviewing more than one subject who has different views to seek the truth of the data that has been obtained. Triangulation of data sources in this study by interviewing two peer teachers and school principals from each research subject. As for documentation, researchers use matching

techniques with the original source.

Data analysis is an inspection activity, cleaning irrelevant data, data modeling, aims to find useful information, provide information so that conclusions can be drawn so as to be able to support decision making. Data analysis in this study uses the theory of Miles and Huberman (Tjetjep Rohendi, 2014) [11] with the stages: data reduction, presenting data, and drawing conclusions. The notion of reducing data is interpreted as an activity of classifying, directing, sharpening data to suit the research focus and irrelevant data will be discarded. Presentation of data is an activity in compiling data so that researchers can make it possible to draw conclusions. The data in this study were texts from interviews, field notes, teaching module documents, and mathematics learning outcomes. Meanwhile, the notion of drawing a conclusion from the presentation of data is intended as an activity of synthesizing the data presented for decision making. The results obtained in this study are a description of the views of elementary school (SD) teachers on the results of learning mathematics from the psychomotor domain in the implementation of the independent curriculum.

Results and Discussion

The results of observations and interviews obtained the following data:

1. 40 out of 40 teachers (100%) gave the view that the result of learning mathematics is to develop logical, analytical, systematic, critical, and creative thinking.

In learning mathematics, the teacher is able to formulate the stages of achievement. This stage can be described by teachers in teaching modules and presentations during teacher work activities (KKG). The teacher is able to describe the stages of developing the cognitive domain. These stages are: remembering, understanding, applying, analyzing, evaluating, and creating. The results of this description are in accordance with the Pusdiklat Perpusnas (2021) [15] which states that the revised results of Bloom's Taxonomy can be grouped into two, namely: low order thinking skills (remember, understand, and apply) and high order thinking skills (analyze, evaluate, and create).

This means that the teacher is able to describe the truth values from the cognitive domain to develop and know the stages of knowledge achieved by students. The teacher's ability is to describe indicators in building knowledge (cognitive domain) in accordance with the National Library of Education and Training Center (2021), namely: facts, conceptual, procedures, and metacognitive. The definition of facts is information that explains the phenomenon of learning mathematics. Conceptual means understanding categories, structures, and theories in mathematics. Procedures mean the teacher's ability in learning mathematics to use appropriate techniques and methods, as well as to use them in a timely manner. Meanwhile, metacognitive means the teacher's ability to formulate and determine self-knowledge, decision strategies, and thinking about thinking.

2. 40 out of 40 teachers (100%) gave the view that the results of learning mathematics are able to develop knowledge when learning with a contextual approach.

The teacher is able to describe the values contained in the affective domain indicators. This description is in accordance with Gamal Thabroni (2022) [6] who explains the stages of the affective domain, namely: the receiving stage, the responding stage, the appreciating stage, the organizing stage, and the value characterization stage. Affective domain indicators are written in operational verbs in teaching modules and carried out during learning with contextual models. The implementation of mathematics learning is realized in the form of groups and the material is related to the socio-cultural environment that exists around students.

Disclosure of truth values embodied in the form of indicators, based on the teacher's understanding of knowledge can be built through social interaction activities. Schunk (2012) [17] states that Vygotsky's learning theory focuses more on the interaction of social (interpersonal), cultural-historical, and individual factors as the key to the development of students (humans in general). This means that the teacher will be able to describe the indicators of the affective domain because the teacher understands the learning theory that supports learning mathematics

3. The teacher gives the view that the results of learning mathematics are not related to the development of the psychomotor domain.

a) 29 out of 40 teachers (72.5%) stated that psychomotor indicators cannot be described because psychomotor relates to physical while mathematics relates to cognitive. The above statement is supported by the following data:

Operational verbs written in teaching modules lead to indicators of remembering, understanding, and applying, such as: recalling formulas (which have just been taught), explaining the results of observing environmental objects, and demonstrating learning outcomes. When analyzed, these data lead to cognitive development in the form of memorizing mathematical formulas. It is said to memorize because the indicator of recall is manifested by various strategies, such as: the emergence of a multiplication list 1 to 10 which must be memorized because it becomes the basis for further multiplication operations, and the ladder process to express the size of the object's weight (0 one decreases up and increases one when it goes down 0 one).

The indicator explains, one of them, is directed to find out the relationship between objects and their partial size. For example, the relationship between plane and space geometric objects with the formula for finding area and volume. The mathematical formula is made in partial form, such as: the formula for the area of a square with a rectangle will be written in two formulas, namely:

The formula for the area of a right triangle will be written:

Area = 1/2 x height x base

The formula for the area of a Square will be written:

Area = Side x Side

The formula for the area of a Rectangle will be written:

Area=Length x Width

The area formula above is in principle the same, namely the line forming the area that is the focus of the calculation. This is because the mention of the location of the lines forming the three fields does not explain the similarity of focus. If this is explained, then students will have an understanding that the area of all plane shapes is the line that becomes the operational focus multiplied by the line that becomes the operational focus. So that the teacher only

needs to give one formula for each finding the area of the plane.

Demonstration activities in learning mathematics are directed at building mathematical formulas. However, demonstration activities carried out by students are to imitate the steps that have been carried out by the previous teacher. Several activities that can be a concern during demonstration activities, for example speed material. The speed formula is directed to memorize through the game of placing symbols in the corners of an equilateral triangle. The v symbol is placed parallel to the t symbol, while the s symbol is placed above the v and t symbols. The speed formula is written:

$$v = \frac{s}{t} ,$$

Where:

v=speed,
s=distance (Km),
t=time (hours)

b) 7 out of 40 teachers (17.5%) stated that psychomotor indicators were seen from the willingness of students to copy math work.

Indicators of students having a willingness to copy math work on the blackboard are directed as the development of motor skills. This statement is assumed to be an indicator of the development of the psychomotor domain by the teacher. The teacher's assumption is in line with Prawira (in Azra Fauzi, Deni Sawitri, Syahrir, 2020) [3] which states that indicators of the psychomotor domain are the dimensions of physical action to: realize skills in performing, train with selected activities, assemble, prepare, and use a set of tools precisely and correctly.

This argument is also supported by psychological theories about storing knowledge in students' memories. Novita Tandry (in Muhamad Arpan, 2016) [12] states that 60% of students' memory comes from actions, 40% when they see, and 30% when they hear. This psychological theory is still the basis for teachers in explaining that learning mathematics after the teacher has finished explaining on the blackboard, the student's obligation is to copy. Through copying activities, the teacher has the hope that the results of the copy will be studied at home. Next will be given practice questions to be able to understand the material that has been taught. The above data, in theory, still focuses on the notion that the development of the psychomotor domain is physical activity.

c) 4 out of 40 teachers (10%) stated that students were able to imitate the stages of solving math problems.

The data obtained from the statement above is that after the teacher explains the completion of the sample questions, students will be given examples of similar questions with different numbers. This indicator is included in the cognitive domain for the remembering group. Through the provision of other but similar questions, imitation of the stages of problem solving will be understood by students. This means that giving practice questions is to practice remembering formulas. It is said so because when students are given other problem material, for example cognitive indicators are increased from remembering (cognitive-1) to applying (cognitive-3) then students are not able to complete.

Suppose the teacher explains the multiplication operation that begins with the concept:

$$4 \times 5 = 5 + 5 + 5 + 5$$

$$= 20$$

If students are given a similar question, they will get two answers, namely:

First:

Answers are imitating the stages of completion due to students assume the answer is correct.

$$3 \times 6 = 6 + 6 + 6$$

The answers are in the process of elaborating, not yet getting the multiplication result.

Second:

complete answer.

$$3 \times 6 = 6 + 6 + 6$$

$$= 18$$

If this concept is associated with counting many objects arranged as follows:

o o
0 o
o o

Then students will count these objects one by one because they have not been able to apply the multiplication concept.

The results of the research above, researchers can discuss and describe as follows. Teachers have the assumption that the results of learning mathematics are still oriented towards developing logical, systematic, critical, and creative thinking. So there doesn't seem to be any physical movement like movement in sports subjects. At first glance this can be said to be true because it is supported by Mills' understanding. In his character education book written by Sofyan T, Mills (Sofyan, 2015) [18] states that skills learning is effective if it is carried out using balanced coordination between learning while doing (learning by doing) with an emphasis on aspects of motor development (gross and fine motor). Muscle coordination, and physical skills. From the understanding given by Mills, it seems clear that learning mathematics does not involve muscle movements. So it is natural to say that mathematics does not have indicators regarding the development of the psychomotor domain.

The teacher has not been able to describe his views on the indicators of the psychomotor domain. This is because teachers do not understand the right time to see indicators of the psychomotor domain when learning mathematics. The results of the analysis of the teaching module documents and the results of observations, it appears that the learning targets written in the teaching modules, the focus of learning mathematics is to develop the cognitive and affective domains. The teacher's inability to pack the time to see indicators of psychomotor development indicates that the teacher will only focus on the cognitive and affective domains. Sofyan T (2015) [18] states that psychomotor learning outcome indicators are a continuation of cognitive and affective learning outcomes. This can be seen after students can show certain behaviors that are in accordance

with the indicators contained in these two domains in the lives of students every day. From this understanding, it can be understood that teachers have not been able to pay attention to and describe indicators of the psychomotor domain in learning mathematics because they have not been able to determine the time when learning mathematics occurs.

The indicators for the development of the psychomotor domain are a continuation of the results of learning mathematics from the cognitive and affective domains, because psychomotor will show behavior that uses reasoning, logical criticality. This is in accordance with Susanto's statement (2013) [22] that indicators of the psychomotor domain are indicator statements that show the ability to use logical thinking, reasoning, and effective and efficient behavior so that certain results and creativity are realized. This can be interpreted that when learning mathematics is finished, but has not yet evaluated the material, the teacher can formulate what indicators appear for the psychomotor domain. Based on the above understanding, the formulation of psychomotor domain indicators from the results of learning mathematics is physical movement that is connected to the logical flow of students.

Indicators in the psychomotor domain of mathematics learning outcomes are actions as a form of thought. This is in accordance with Asep's statement (in Muhamad Arpan, 2016) [12] which states that indicators of the psychomotor domain can be classified into four categories, namely moving, manipulating, communicating, and creating. This understanding makes the teacher experience difficulties in describing. Actions as a form of thought are displayed by various students, but have the same physical movements. Some movements that can be observed as a form of student thinking in the form of manipulating, for example: indicators of the cognitive domain in the word remember and with the operational verb write. This activity is manifested as an activity of copying what is on the blackboard. Copying activities are coordination of head movements following the eyes and hand speed in emphasizing letters in a book. This coordination shows that the indicator of imitating with the verb to copy can be described with several possibilities, namely:

1. The speed of copying is relatively fast indicating the level of memory can be categorized as good (can be ready to follow the next math material).
2. The relative speed of copying is medium indicating the level of remembering it can be categorized as medium (not ready to follow the next material).
3. The speed of copying is slow or sometimes late, indicating a low level of memory (it can be described as students not being ready to proceed to the next material).

Movement as a manifestation of students' thinking actions, shows that the psychomotor domain can be described to see the ability of students to follow and master mathematical material. This is in accordance with Shah (Sugiman, 2008) [19] which states that students' psychomotor skills are manifestations or actions as a concrete manifestation of their knowledge, awareness, and mental attitudes.

Conclusion

Teachers have not been able to describe views of psychomotor indicators concretely. This is because teachers have the assumption that mathematics has a relationship with cognitive development. This is indicated by not understanding the right time to obtain psychomotor domain indicator data and forms of action as a form of thought.

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